[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 282 **L**

Unique Paper Code : 2373010013

Name of the Paper : Statistical Computing and Basic Data Mining

Name of the Course : **B.Sc. (H) Statistics**

Semester : VI (NEP-UGCF)

Duration : 3 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **six** questions in all. Question no. **1** is compulsory.
3. Attempt **Five** questions from the remaining questions.
4. Use of non-programmable scientific calculator is allowed.

1. Attempt any *three* parts:

(a) Write the algorithm for generating a random sample of size n from Uniform [0, b] distribution.

(b) Explain the any well-known method for generating discrete random variables.

(c) Suppose that $X_1, X_2, \ldots, X_n$ is a random sample of size n from a continuous distribution with c.d.f. F. How will you generate $X_{(1)}$?

(d) What is a Poisson Process? [3x5=15]

2. (a) Explain 'Acceptance Rejection Method' of random variable generation. What is its efficiency?

(b) Use acceptance rejection method to generate a random sample of size n from the Normal $(\boldsymbol{\mu}, \boldsymbol{\sigma^2})$ distribution? [7, 8]

P.T.O.

3. (a) What is the inverse transform method of random variable generation? How would you use this method to generate exponential random variables with parameter λ?

   (b) Using inverse transform method, generate 5 exponential random variables with parameter 5 using the following random numbers:

   0.35, 0.92, 0.27, 0.65, 0.99 [8,7]

4. (a) Explain in detail the 'Markov Chain Monte Carlo' method.

   (b) What do you mean by naive Bayes classifier? [7, 8]

5. Write the algorithm to generate a homogeneous Poisson process defining clearly the underlying process. [15]

6. (a) What is 'Data Pre-processing'? Explain in detail.

   (b) Explain in detail the Metropolis-Hastings Algorithm. [7,8]

7. (a) Explain how to generate Gamma (α, β) random variables. Write down the steps for same.

   (b) Generate 2 Geometric (0.5) random variables using any suitable method. Use the following uniform random numbers: 0.2688, 0.5255. 0.1435, 0.9647, 0.6915. Show all steps clearly. [8,7]